National Institute of Environmental Health Sciences

Influence of weather conditions, drugs and comorbidities on serum Na and Cl in 13000 hospital admissions: Evidence for a subpopulation susceptible for SIADH

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Year: 2014
Journal: Clinical Biochemistry. 47 (8-Jul): 618-624

Abstract:

Objectives: Considerable variation in serum sodium (Na) and chloride (Cl) is found in patients at hospital admission. Our goal was to quantify the respective impact of drugs, comorbidities, demographic factors and weather conditions on serum Na and Cl. Design and methods: For 13. 277 consecutive patients without terminal kidney disease admitted to the Department of Internal Medicine of the Kantonsspital St. Gallen drug history on admission, age, sex, body weight, ICD-10 diagnoses, and laboratory data were extracted from electronic medical records. Weather parameters prior to hospital admission were also integrated in a multivariate regression analysis. Results: Both serum Na and Cl showed an asymmetric left-tailed distribution. Median (interquartile range) Na was 138 (136/140) and Cl 104 (101/106). The distribution of sodium in patients with one or more risk factors for SIADH was best explained by the presence of two populations: one population with a similar distribution as the unexposed patients and a smaller population (about 25%) shifted to lower sodium levels. Lower weight, lower blood pressure, kidney dysfunction, fever, and diabetes were associated with both lower Na and Cl. Higher ambient temperature and higher air humidity preceding admission were associated with both higher Na and Cl values. Conclusions: Na and Cl at hospital admission are highly influenced by ambient weather conditions, comorbidities and medication. The bimodal distribution of Na and Cl in persons exposed to risk factors for SIADH suggests that SIADH may only affect a genetically distinct vulnerable subpopulation.

Source: http://dx.doi.org/10.1016/j.clinbiochem.2013.12.021

Resource Description

Exposure : ☑

weather or climate related pathway by which climate change affects health

Meteorological Factors, Temperature

Temperature: Fluctuations

Geographic Feature: ☑

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Switzerland

Health Impact:

specification of health effect or disease related to climate change exposure

Urologic Effect, Other Health Impact

Other Health Impact: inappropriate secretion of ADH; serum sodium; serum chloride

Population of Concern: A focus of content

Population of Concern:

populations at particular risk or vulnerability to climate change impacts

Elderly

Other Vulnerable Population: pre-existing medical conditions

Resource Type:

format or standard characteristic of resource

Research Article

Timescale:

time period studied

Time Scale Unspecified